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Economic Intelligence Report

CONSUMPTION OF ELECTRIC POWER IN THE USSR
1945–65

CIA/RR ER 62-11

April 1962

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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Economic Intelligence Memorandum

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FOREWORD

This report summarizes the results of detailed research in depth on consumption of electric power in the USSR during 1945-65. Consumption is estimated by economic sector and by area for the USSR and by branch for Soviet industry. The report also includes estimates of electric power consumed by the Soviet nuclear materials industry that have not heretofore been published by this Office.

Consumption of electric power by the various sectors of the economy is reported annually by the USSR, and consumption by the various branches of industry was reported in detail for 1955. Consumption by the nuclear materials branch of industry was not specifically mentioned but apparently was included in the category "other industry," as the share of this category had tripled since the 1930's. Some of the data for the various branches of industry for years other than 1955 have been reported, others have been derived from reported indexes, and still others have been derived from reported or estimated production multiplied by reported actual or normative unit consumption of electric power. The estimates for consumption of electric power by the nuclear materials branch of industry have been derived in all cases as a residual. The margin of error attached to such residuals may be substantially greater than the margins of error attached to the other estimates of consumption. To reduce this margin of error, the residuals were checked against estimates of consumption of electric power based on the study of individual nuclear materials enterprises. In those cases (as for gaseous diffusion plants) in which the magnitudes were sufficiently large to constitute a significant part of production of electric power by the oblast, the residual and plant methods of estimation agree within 10 to 15 percent over the historical period. For smaller installations the two methods of estimation often had a larger degree of divergence. In spite of the limitations of the available data, the estimates presented are believed to be of the correct order of magnitude for the historical period. The estimate for 1965, based as it is on an interpretation of Soviet plans and projections of past trends, can make no allowance for Soviet decisions concerning the priority to be ascribed to fulfillment of these plans and is subject to margins of error considerably larger than those attached to data for the historical period.

Because this report is a summary of research in depth and is based on a very large number of sources, it is not feasible to document each figure; however, supporting data, methodology, and sources of this report are available in the files of this Office. The report has been coordinated with the Office of Scientific Intelligence.

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Summary and Conclusions

The total final consumption** of electric power in the USSR grew steadily from 37.0 billion kilowatt-hours (kwh) in 1945 to 256.2 billion kwh in 1960 and 286 billion kwh in 1961 and is expected to reach approximately the planned levels of 320 billion kwh in 1962 and 454.8 billion kwh in 1965 (see Table 1***). Soviet final consumption of electric power increased from 15.2 percent of the comparable US consumption in 1945 to 33.3 percent in 1960 and, during the same time period, grew at an average annual rate of 14 percent compared with 8 percent in the US. It is estimated that Soviet consumption of electric power by 1965 will be about 42 percent of that in the US. It is planned that Soviet consumption will grow 12 percent a year for the period 1961-65, compared with a projected growth of 6 percent in the US.

Although there has been a steady growth in consumption of electric power by all sectors of the Soviet economy, the proportional allocation to transportation and the rural economy has increased at the expense of industry and the urban economy. Nevertheless, the latter two sectors still accounted for approximately 74 and 12 percent, respectively, of the total final consumption in 1961.

Consumption of electric power by industry in the USSR increased at an average rate of about 13.5 percent a year, growing from 28.4 billion kwh in 1945 to 190.5 billion kwh in 1960 and 213 billion kwh in 1961. Plans call for consumption to grow at an average annual rate of 12 percent, to 238 billion kwh in 1962 and 332 billion kwh in 1965. Consumption in industry grew from 20 percent of the US level in 1945 to 48 percent in 1960 and is planned to grow to 57 percent of the projected US level in 1965. The increases in consumption

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* The estimates and conclusions in this report represent the best judgment of this Office as of 1 April 1962.

** Final consumption of electric power is consumption by the ultimate consumer and excludes power that is used by the powerplants themselves, lost in the process of transmission, or exported from the country. Final consumption averages about 87.5 percent of the total gross production. Gross production of electric power is the net production sent out from the powerplant plus the electric power used by the powerplant itself.

*** Table 1 follows on p. 2.

Table 1

Estimated Allocation of the Total Final Consumption of Electric Power in the USSR, by Economic Sector Selected Years, 1945-62, and 1965 Plan

Billion Kilowatt-Hours

Economic Sector	1945	1950	1955	1960	1961	1962	1965 Plan
Industry	28.4	60.6	113.3	190.5	213.0	238.0	332.4
Construction	1.4	2.6	6.0	9.5	10.7	11.5	14.5
Transportation	1.3	2.6	5.4	14.2	16.4	19.0	29.9
Urban economy	5.5	12.3	20.3	32.5	34.8	38.0	53.0
Rural economy	0.4	1.6	4.1	9.5	11.5	13.5	25.0
Total	37.0	79.7	149.1	256.2	286.4	320.0	454.8

are a reflection of the sustained over-all industrial growth and, more particularly, of the rapid growth of the power-intensive nuclear materials industry.

Consumption of electric power by the other productive sectors of the Soviet economy* grew as fast as or more rapidly than consumption by the industrial sector during 1946-60. Consumption increased at an average annual rate of 14 percent in construction, 17 percent in transportation, and 24 percent in the rural economy, although the annual rate has shown a slightly downward trend. The rapid increases in these sectors are attributable for the most part to a progressively increasing electrification program.

Consumption of electric power by each branch of industry in the USSR has increased steadily each year since 1945. The share allocated to the fuel, ferrous metallurgical, and machine building and metalworking branches of industry decreased from 59 percent in 1945 to 46 percent in 1960. During this period a new industry, the nuclear materials industry, was inserted into the consumption pattern and consumed increasingly larger amounts of electric power until, by 1960, it was using almost 14 percent of all electric power allocated to industry. Apparently the plan is that the proportional allocation to the fuel, ferrous metallurgical, and machine building and metalworking branches of industry

* The urban economy is not considered to be a productive sector in Soviet statistical practice. The annual rate of growth of consumption of electric power by the urban economy was less than 13 percent for the period 1946-60.

will decline to 41 percent by 1965 and that the share of the nuclear materials industry will grow to more than 18 percent. The estimated consumption of electric power in the USSR by consuming branch of industry is shown in Table 2.*

Consumption of electric power by the nuclear materials industry in the USSR is estimated to have grown to 26.4 billion kwh in 1960 and to 31.6 billion kwh in 1961 -- about 3 billion kwh more than were consumed by all industry in 1945. The Soviet plan for consumption of electric power apparently calls for consumption by the nuclear materials industry to continue to grow to about 37 billion kwh in 1962 and 61 billion kwh in 1965. It is estimated that the nuclear materials industry in the USSR used 56 percent as much electric power as did the US Atomic Energy Commission (USAEC) in 1961 and that, if future planned growth is carried out, the Soviet nuclear materials industry in 1965 will be consuming 20 percent more power than the US nuclear materials industry, mostly as a result of rapid growth in the USSR but also in part as a result of planned lower consumption in the US.

The distribution of consumption of electric power in the USSR by area reflects the gradual eastward movement of Soviet economic activity during 1950-58 and the rapid growth, in the eastern RSFSR, of the nuclear materials industry in the Seven Year Plan (1959-65).

Industry has used and will continue to use about two-thirds of the electric power allocated to the European RSFSR and three-fourths of the power allocated to the non-RSFSR republics in the European areas** of the USSR. In these areas the nuclear materials industry has been a negligible factor in the growth of power consumption. The consumption of electric power grew about 150 percent in the Urals area during 1950-58. About one-third of this growth resulted from the expanding requirement of the nuclear materials industry to an estimated level of 8.6 billion kwh in 1958. Although consumption of electric power by the nuclear materials industry is to continue to grow in the Urals area to an estimated level of 15.1 billion kwh in 1965, the major additions to consumption will be in the nonnuclear industries.

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* Table 2 follows on p. 4.

** The areas referred to in this report are those defined on the map, Figure 1, following p. 4, and do not necessarily coincide with the 12 economic regions that formerly existed in the USSR. The term eastern areas as used in this report includes that part of the USSR east of the Urals area -- that is, the eastern RSFSR, Kazakh SSR, and the central Asian republics. The term European areas as used in this report includes that part of the USSR west of the Urals area -- that is, the European RSFSR, the Baltic republics, the Belorussian SSR, the Ukrainian SSR, and the Transcaucasus. The Urals area is considered separately.

Table 2

Estimated Allocation of Consumption of Electric Power in the USSR, by Branch of Industry
1945, 1960, and 1965 Plan

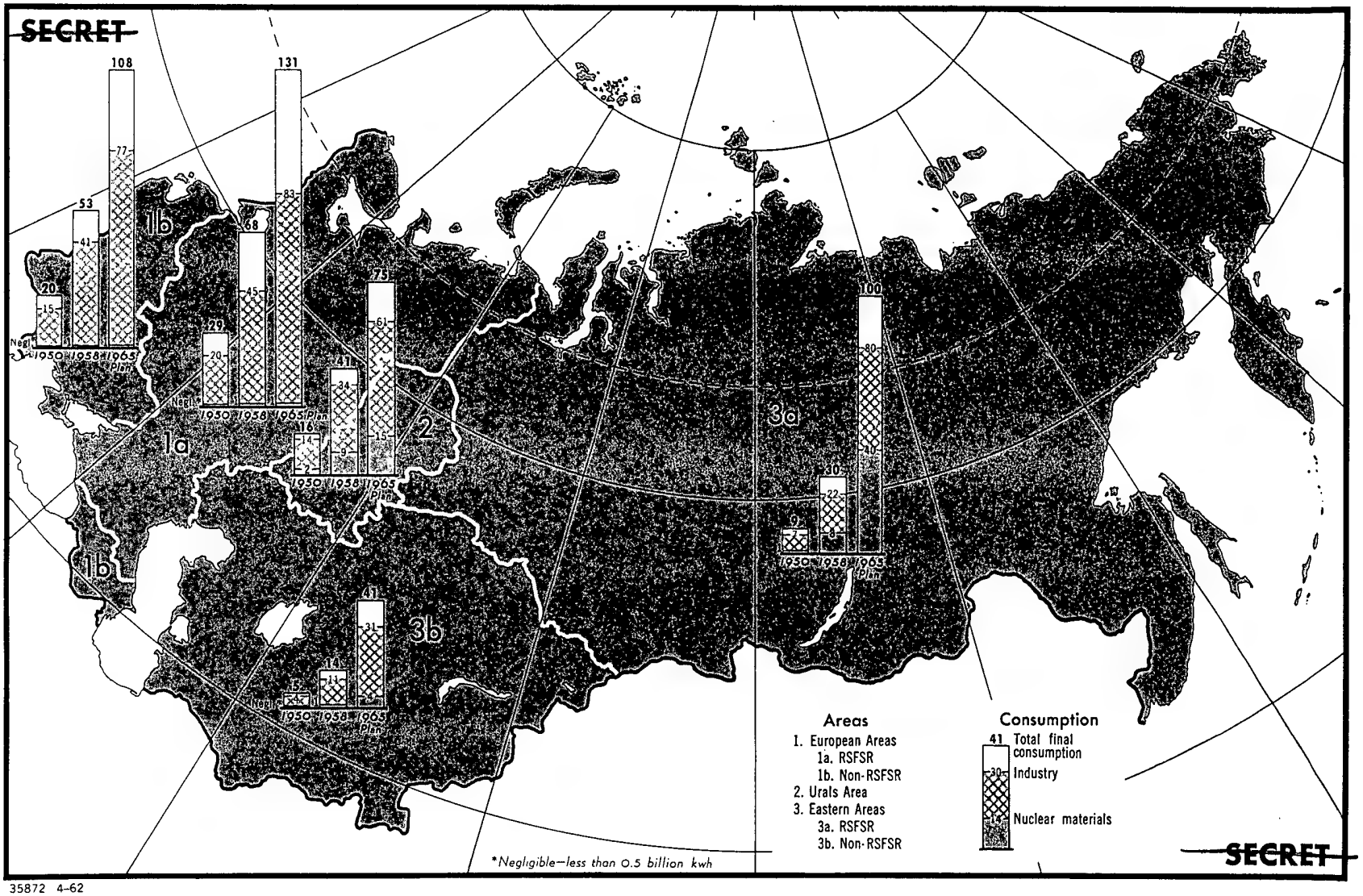
Branch of Industry	1945		1960		1965 Plan	
	Billion Kilowatt-Hours	Percent a/	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent
Fuel	4.2	14.6	28.2	14.8	42.5	12.8
Ferrous metals	5.6	19.7	31.5	16.5	54.9	16.5
Nonferrous metals	3.8	13.2	23.3	12.2	46.5	14.0
Chemical	3.2	11.1	18.0	9.4	34.7	10.4
Machine building and metalworking	7.0	24.7	27.8	14.6	38.0	11.4
Timber, woodworking, and paper	1.0	3.6	7.4	3.9	10.9	3.3
Construction materials	0.6	2.1	10.5	5.5	17.9	5.4
Light industry	1.4	5.0	8.1	4.3	12.9	3.9
Food industry	1.2	4.2	5.7	3.0	7.6	2.3
Nuclear materials	Negl.	Negl.	26.4	13.9	60.8	18.3
Other industry	0.4	1.8	3.6	1.9	5.7	1.7
Total	28.4	100.0	190.5	100.0	332.4	100.0

a. Because of rounding, data may not add to the total shown, and percentages may not be directly derived from the absolute data shown.

Figure 1

Estimated Distribution of Consumption of Electric Power in the USSR by Area, 1950, 1958, and 1965 Plan

(Billion Kilowatt-Hours)



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The influence of the growth of the nuclear materials industry is most apparent in the eastern RSFSR. About one-third of the 210-percent increase in consumption of electric power in this area during 1950-58 occurred as a result of the expanding consumption by the nuclear materials industry to an estimated level of 7.9 billion kwh in 1958. About one-half of the 220-percent increase in consumption of electric power planned for the area during 1958-65 apparently will be attributable to increased consumption by the nuclear materials industry; it is estimated that in 1965 the nuclear materials industry in the eastern RSFSR will consume about 40 billion kwh, two-thirds of the total national consumption of electric power by the industry. In the Central Asian republics, although the nuclear materials industry has continued to use about 10 to 15 percent of the total consumption, the major impetus to growth in consumption of electric power is nonnuclear industry.

A continuation of recent past trends in the growth of consumption of electric power by the various sectors of the Soviet economy would result in the goals for consumption of electric power by the construction and transportation sectors in 1965 being exceeded by about 2 billion and 5 billion kwh, respectively. A similar projection for the industrial, urban, and rural sectors indicates that their goals for consumption will not be fulfilled. It is estimated that industry will consume about 5 billion kwh less than the goal and that the urban and rural sectors will each fall short of its consumption goal by about 2 billion kwh. A projection of past trends would thus result in the total final consumption falling short of the planned goal by 2 billion kwh. Within the industrial sector a series of estimates for individual industries, most of which were based on past trends, indicates that consumption probably will exceed the goal by about 5 billion kwh in the machine building and metalworking industries and by 3 billion kwh in the construction materials industry. On the other hand, consumption may fall short of the plan by 4 billion kwh in the chemical industry and by about 2 billion kwh in each of the following: the nonferrous metals industry; the timber, woodworking, and paper industry; and light industry and will approximately fulfill the plan in the other nonnuclear industries. If Soviet industry as a whole fails to fulfill the plan for consumption of electric power by 5 billion kwh and nonnuclear industry fails by 2 billion kwh, the nuclear materials industry will fall short of its goal by about 3 billion kwh. The underfulfillment of plans for consumption of electric power indicated above for all final consumers, for industry as a whole, and for the nuclear materials industry is in each case so small as to fall well within the range of error attached to the estimates of consumption by these consumers, and it is estimated that plans for the total consumption of electric power will be approximately fulfilled.

I. Allocation of the Total Final Consumption by Economic Sector

A. Trends

The total final consumption of electric power by the Soviet economy grew steadily from 37.0 billion kwh in 1945 to 256.2 billion kwh in 1960 and 286.4 billion kwh in 1961 and is expected to reach approximately the planned levels of 320 billion kwh in 1962 and 454.8 billion kwh in 1965. The estimated final consumption of electric power in the USSR is given in Table 4* and is shown graphically in Figure 2.** Final consumption increased from 85.5 percent of the total gross production in 1945 to 87.6 percent in 1960 and is expected to remain at this level through 1965. Soviet final consumption of electric power increased from 15.2 percent of comparable US consumption in 1945 to 33.3 percent in 1960 and has grown at an average annual rate of 14 percent, compared with 8 percent in the US. By 1965, Soviet consumption of electric power will be about 42 percent of projected US consumption. Soviet consumption is planned to grow at a rate of 12 percent a year during 1961-65, compared with a projected 6 percent in the US. Consumption of electric power in the US is compared with that in the USSR in the chart, Figure 3.**

B. Allocation

The estimated allocation of the final consumption of electric power to the consuming sectors of the Soviet economy for selected years, 1945-65, is summarized in Table 3 and is shown graphically in Figure 2.** There was a steady growth in consumption of electric power by all sectors throughout 1945-61, but the proportional allocation to transportation and the rural economy increased at the expense of industry and the urban economy. Estimated rates of growth in consumption of electric power by the various sectors of the Soviet economy are shown in Table 3.***

1. Industry

Consumption of electric power by industry in the USSR increased at an average annual rate of 13.5 percent, growing from 28.4 billion kwh in 1945 to 190.5 billion kwh in 1960 and 213 billion kwh in 1961, and is planned to grow at an average annual rate of about

* Table 4 follows on p. 9.
** Following p. 10.
*** Table 3 follows on p. 8.

[p. 6 blank]

12 percent to a level of 238 billion kwh in 1962 and 332 billion kwh in 1965. Consumption by industry declined from 76.7 percent of the total final consumption of electric power in the USSR in 1945 to 74.3 percent in 1960 and is planned to decline further to 73.1 percent in 1965. Consumption by industry grew from 20 percent of the US level in 1945 to 48 percent in 1960 and is planned to grow to 57 percent of the projected US level in 1965 (see Figure 3*).

Table 3

Estimated Average Annual Increases in Consumption of Electric Power in the USSR, by Economic Sector, for Five-Year Periods 1946-65

Percent

Economic Sector	1946-50	1951-55	1956-60	1961-65 Plan
Industry	16	13	11	12
Construction	13	18	10	9
Transportation	15	16	21	16
Urban economy	18	10	10	10
Rural economy	32	21	18	21
Total final consumption	17	13	12	12

Consumption of electric power by industry has grown at a more rapid rate than industrial production. During 1950-60 the index of consumption of electric power by industry grew at an average of 1 percent a year faster than the officially announced Soviet index of the gross value of industrial output and 3 percent a year faster than a computed index of industrial output.** During 1960-65 the index of consumption of electric power by industry is expected to continue to grow 3 percent a year faster than the computed index of industrial output. A comparison of indexes of growth of consumption of electric power and of output is given for the productive sectors of the Soviet

* Following p. 10.

** An index of gross values for individual commodities and branches aggregated by 1955 value-added weights. This index is as comparable as data will permit with the index of industrial production of the US Federal Reserve Board.

Table 4

Estimated Consumption of Electric Power in the USSR, by Economic Sector
Selected Years, 1945-62, and 1965 Plan

Economic Sector	1945		1950		1955		1958		1960		1961		1962		1965 Plan	
	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent
Industry	28.4	76.7	60.6	76.0	113.3	76.0	154.2	74.8	190.5	74.3	213.0	74.4	238.0	74.4	332.4	73.1
Construction	1.4	3.8	2.6	3.3	6.0	4.0	7.8	3.8	9.5	3.7	10.7	3.7	11.5	3.6	14.5	3.2
Transportation	1.3	3.5	2.6	3.3	5.4	3.6	9.2	4.5	14.2	5.5	16.4	5.7	19.0	5.9	29.9	6.6
Urban economy	5.5	14.9	12.3	15.5	20.3	13.6	28.0	13.6	32.5	12.6	34.8	12.2	38.0	11.9	53.0	11.6
Rural economy	0.4	1.1	1.6	1.9	4.1	2.8	6.9	3.3	9.5	3.9	11.5	4.0	13.5	4.2	25.0	5.5
Total final consumption	37.0	100.0	79.7	100.0	149.1	100.0	206.1	100.0	256.2	100.0	286.4	100.0	320.0	100.0	454.8	100.0
Transmission losses, use by powerplants, and net exports a/	6.3		11.5		21.1		29.3		36.3		40.6		46.0		65.2	
Total gross consumption b/	43.3		91.2		170.2		235.4		292.5		327.0		366.0		520.0	

a. Exports are planned to be 1.2 billion kilowatt-hours in 1965.
b. Equivalent to the total gross production, as there are no stockpiles.

Figure 2

Estimated Consumption of Electric Power in the USSR by Economic Sector, 1945-65

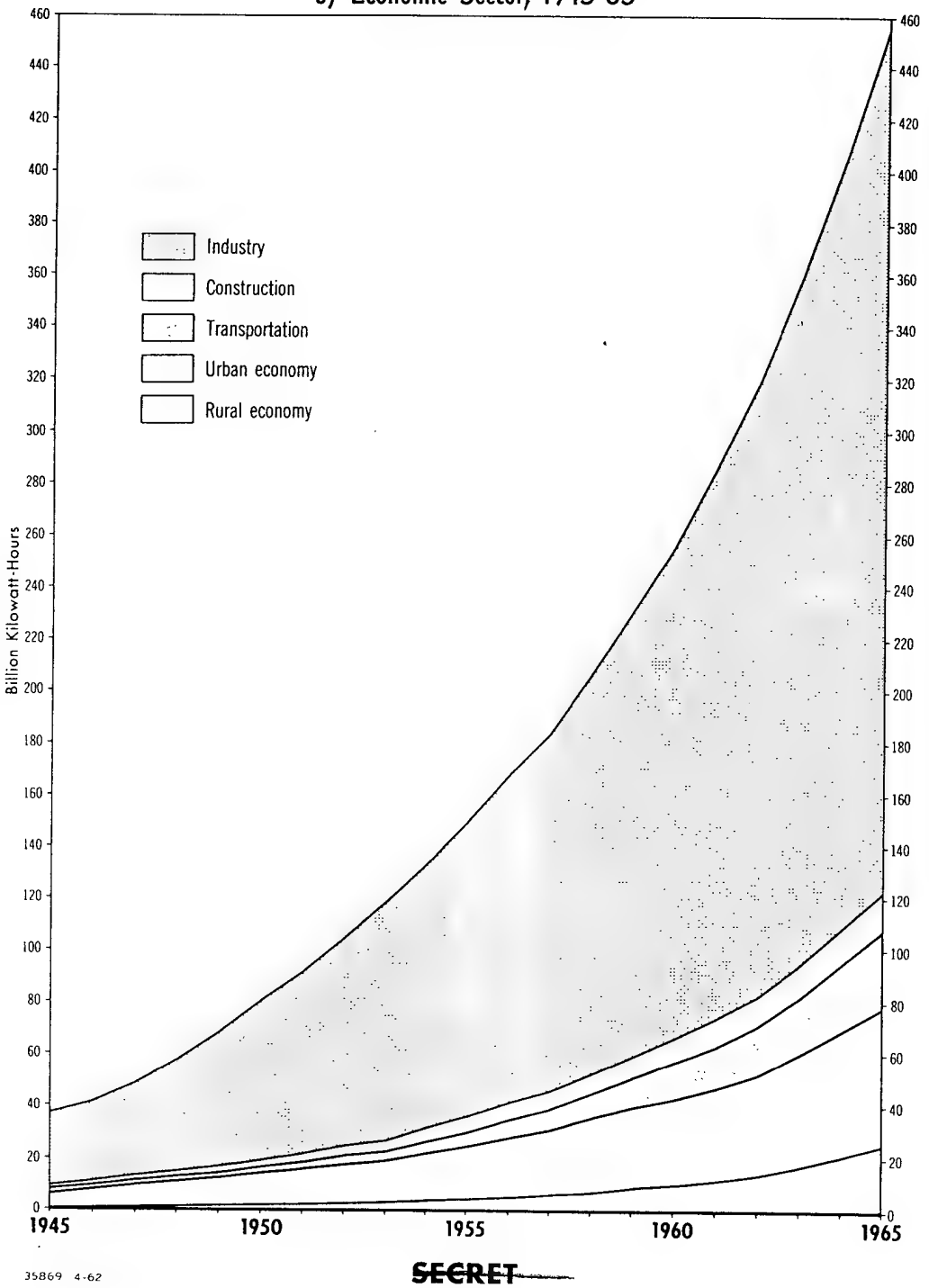

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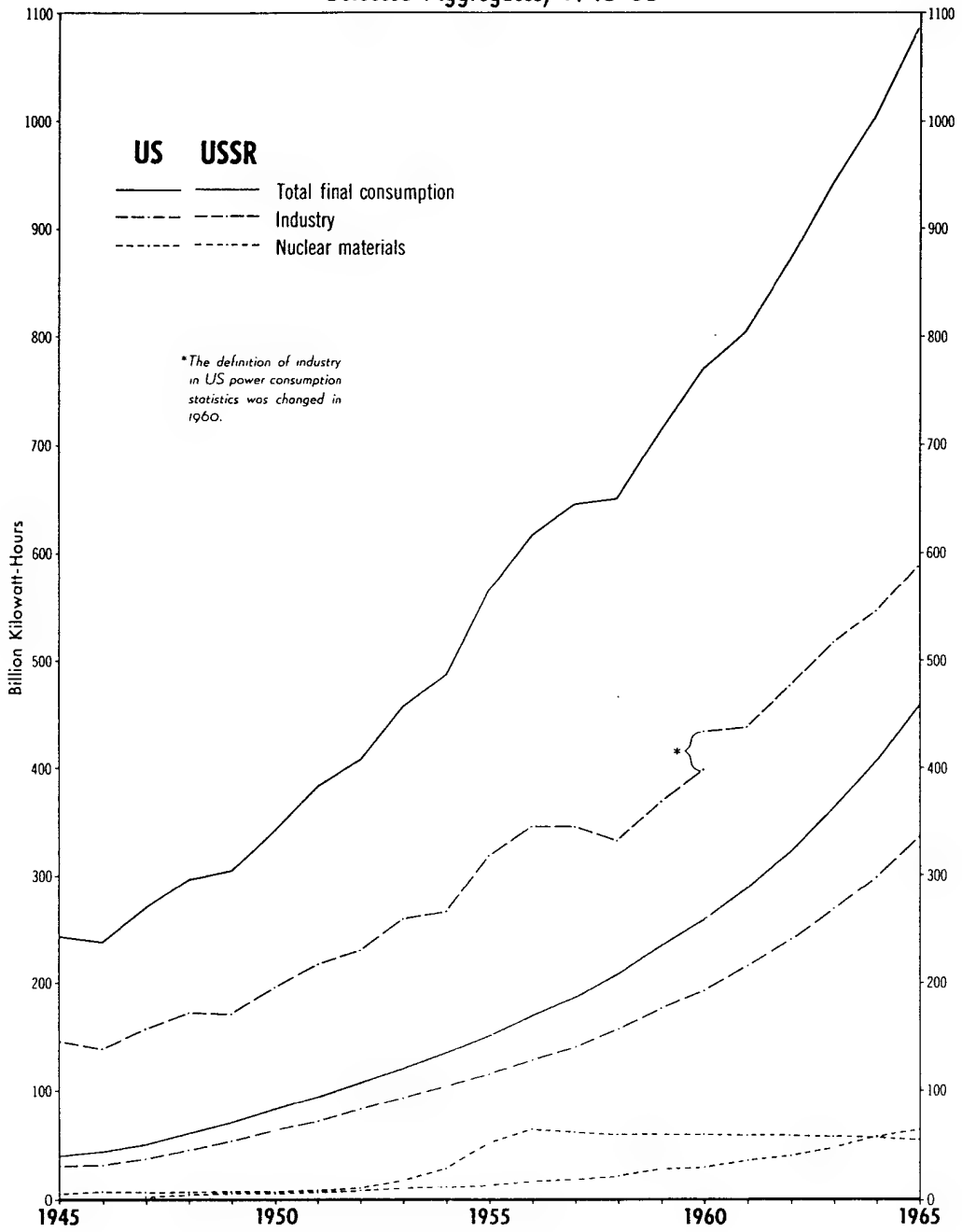
Figure 3

Estimated Consumption of Electric Power in the US and the USSR
Selected Aggregates, 1945-65



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economy* in the chart, Figure 4.** The more rapid growth in consumption of electric power has been a result of a structural shift in consumption of electric power within the industrial sector, attributable in part to the fact that power-intensive electrotechnical uses*** (largely in the metallurgical, chemical, and machine building industries) have consumed an ever-increasing share of the total consumption and in part to the steadily growing importance of consumption of electric power by the nuclear materials industry.

Consumption of electric power in Soviet industry per productive wage worker increased 83 percent during 1950-59 and in the latter year reached 9,284 kwh per worker, 32 percent of the US level at that time. During 1950-59 the number of productive wage workers in the USSR grew by 56 percent.

The major use of electric power in Soviet industry has been for motor drive for production machinery. Consumption of electric power for motor drive declined as a share of the total consumption by industry from 62.2 percent in 1945 to 61.5 percent in 1958 and is to decline further to about 55 percent in 1965. The major consumers of electric power for motor drive in 1961 were the fuel, ferrous metallurgical, machine building and metalworking, and nuclear materials industries. In the latter industry, gaseous diffusion plants consumed most of the power that went to motor drive.

The most rapidly growing type of use for electric power in Soviet industry is technological use for electrochemical and electrothermal purposes. Such consumption grew from 25.2 percent of the total industrial consumption of electric power in 1945 to 27.8 percent in 1958 and is planned to increase to 35 percent in 1965. About one-third of the technological consumption of electric power in 1958 was by the nonferrous metals industry. The ferrous metallurgical, chemical, and machine building industries each accounted for nearly 15 percent of the total technological consumption of electric power. Half of the expenditures for technological use in the chemical industry were for coproduction of heavy water

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* Industry, construction, transportation, and the rural economy are considered to be the productive sectors of the economy in Soviet statistical practice.

** Following p. 12.

*** Electrotechnical uses include the electrothermal production of such items as electric steel, ferroalloys, and carbide; the electrochemical production of such products as aluminum, chlorine, and heavy water; and various other electrotechnical processes such as induction heating and electric welding.

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and synthetic ammonia. The nuclear materials industry used about 5 percent of the total technological consumption for production of calcium, lithium, and other products.

Consumption of electric power for other uses (mostly lighting and ventilation) by Soviet industry steadily declined as a percentage of total use, from 12.6 percent in 1945 to 10.7 percent in 1958, and may decline further to 10 percent in 1965.

2. Other Sectors

Consumption of electric power in the other productive sectors of the Soviet economy grew more rapidly than in the industrial sector during 1945-60, having increased at an average annual rate of 14 percent in construction, 17 percent in transportation, and 24 percent in the rural economy, although the annual rate showed a slightly downward trend. The rapid increases in these sectors have been attributable almost exclusively to a progressively increasing electrification program.

As a result of the rapid electrification of construction activity, consumption of electric power by the construction sector of the economy grew much more rapidly than did construction and installation work during 1950-55. Since 1955, however, the increasing emphasis on the more efficient use of electric power and the rapid growth of the precast reinforced concrete industry have depressed the rate of growth in consumption of electric power compared with construction activity. Consumption of electric power by the precast reinforced concrete industry is amalgamated with industry rather than with construction. It is estimated that construction and installation work will continue to grow as rapidly as consumption of electric power by the construction sector during 1960-65 (see Figure 4*).

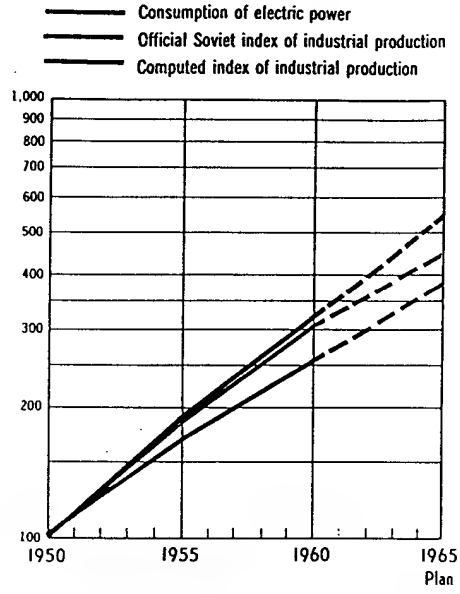
The rapid growth in consumption of electric power by the transportation sector also has been accompanied by a structural change in the pattern of power consumption by the sector, involving much more rapid growth in consumption of power by electric traction. By 1960, consumption of electric power had grown to 14.2 billion kwh, almost 11 times the 1945 level, while traffic turnover had grown less than 5 times (see Figure 4). It is estimated that consumption will grow to 19 billion kwh in 1962 and to 30 billion kwh in 1965. The expansion of electric traction on Soviet railroads accounted for 10.4 billion kwh of the 12.9-billion-kwh increase in the use of electric power by this sector during 1945-60 and is expected to account for all but 1 billion kwh of the 15.7 billion kwh of growth anticipated during 1960-65.

* Following p. 12.

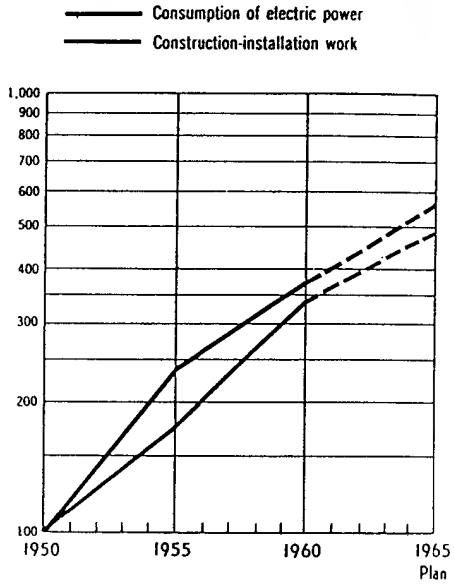
Figure 4

Estimated Indexes of Growth of Consumption of Electric Power and of Output in the USSR, by Economic Sector, 1950-65

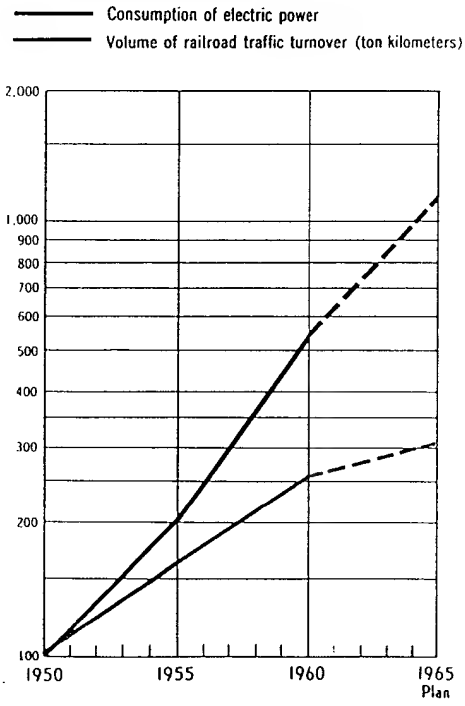
INDUSTRY



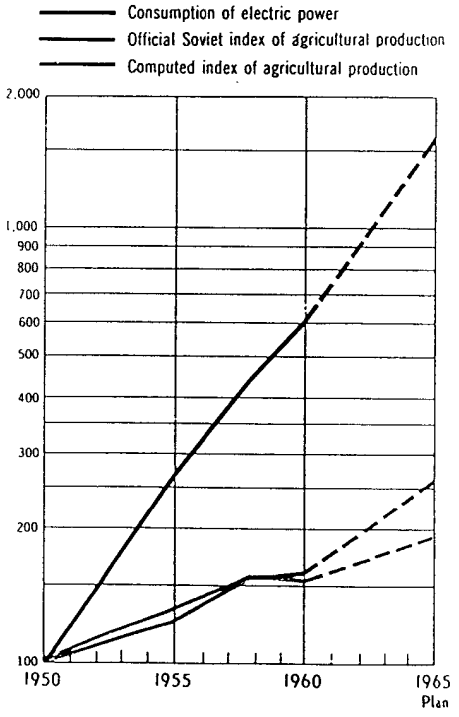
CONSTRUCTION



TRANSPORTATION



RURAL ECONOMY



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The rates of growth in consumption of electric power have been most rapid for the rural economy, partly because of the extremely low level of electrification prevailing in this sector in 1945. Consumption rose from 0.4 billion kwh in 1945 to 9.5 billion kwh in 1960 and 11.5 billion kwh in 1961 and is planned to continue to increase at a rate of about 21 percent per year to 25 billion kwh in 1965. Less than 10 percent of the kolkhozes and 50 percent of the sovkhozes and tractor stations were electrified in 1945. By 1960 the proportion using electricity in some form had grown to 71 percent and 100 percent, respectively. Although all agricultural enterprises are to be electrified by 1965, the level of the average consumption of electric power by each electrified kolkhoz is to fall still further behind that of each electrified sovkhoz as the result of the progressively fuller electrification of the sovkhozes. Whereas in 1950 the average electrified kolkhoz used 66 percent as much power as the average electrified sovkhoz, by 1960 the kolkhoz level had fallen to 39 percent, and by 1965 it will fall further to 30 percent of the sovkhoz level.

In contrast to the situation in the other productive sectors of the Soviet economy, the increasing electrification of the rural economy is to be attributed as much to social and ideological as to direct economic motives. The growth in rural electrification has been directed mainly toward bringing the amenities of the city to the village and to mechanizing the stationary work of the farm laborer.

Consumption of electric power by the urban economy increased at an average annual rate of 12.6 percent during 1945-60, from 5.5 billion kwh in 1945 to 32.5 billion kwh in 1960. Although the share of the urban economy in the total final consumption of electric power in the USSR declined slightly -- from 14.9 percent in 1945 to 12.6 percent in 1960 -- the urban economy has remained the second largest consuming sector. Consumption by the urban sector of the economy is planned to increase to 53 billion kwh in 1965, when the sector is to use only 11.6 percent of the total final consumption. Within the urban sector, however, consumption of electric power for living needs (including stores and schools) has grown only 11 percent a year. The most rapidly growing part of the urban sector of the economy (in terms of consumption of electric power) has been the governmental part, which includes administrative, communications, military, and research facilities. Consumption of electric power by governmental establishments increased 20 percent a year during 1946-58 and 30 percent a year during 1956-58 alone. Consumption of electric power for living needs per urban inhabitant in the USSR remained about 10 to 11 percent of similar US expenditures during 1945-60. Because of the much more rapid rate of growth of the total final consumption in the USSR, however, living needs have taken an increasingly smaller share of the total consumption of electric power in the USSR, while at the same time such needs have taken an increasingly larger share in the US.

It is possible, if past trends in consumption of electric power continue, that the planned levels of consumption by the construction and transportation sectors of the economy in 1965 will be exceeded by as much as 2 billion and 5 billion kwh, respectively. It is equally possible that consumption in the industrial sector of the economy will fall short of the 1965 goal by as much as 5 billion kwh and that the urban and rural sectors will each fail to achieve their goals by about 2 billion kwh. The total final consumption thus may fall 2 billion kwh below the planned level of 454.8 billion kwh. The probability of such a small underfulfillment cannot be established at this time.

C. Distribution by Area

The distribution of the final consumption of electric power in the USSR during 1950, 1955, 1958, and 1965, by area, is shown in Table 5* and on the map, Figure 1.** Consumption of electric power in the eastern areas has grown more rapidly than in any other area, having grown at a rate 1.2 times the national average in the years 1950-58. Consumption in these areas is planned to grow at a rate 1.4 times that planned for the country as a whole during 1958-65. The share of the eastern areas in the total final consumption of electric power in the USSR increased from 18 percent in 1950 to 22 percent in 1958 and is to grow to 31 percent in 1965. The only other area to increase its consumption more rapidly than the national average was the non-RSFSR area of the European USSR, which in 1950 had not yet fully repaired the war damages. Consumption in the Urals area was about 20 percent of the national total in 1950, 1955, and 1958 but will decline to 16 percent in 1965. The fuel-short European RSFSR used a smaller portion of the total final consumption of electric power in 1958 than in 1950 and will use a still smaller share in 1965.

The great variations by area in the structure of the allocation of electric power in the USSR in 1958 are shown on Table 6.*** The Urals area, which has a relatively greater concentration of heavy industry than the other areas, allocates 85 percent to industry, whereas the national allocation is about 75 percent to industry. The older areas of the European RSFSR allocate 67 percent. The comparatively slow rate of expansion of the economy of the Urals area is reflected by the fact that it used only 2 percent of its power for construction, whereas other areas more closely approximated the national average of 4 percent. The influence of the electrification of the Trans-Siberian Railroad is shown in the high allocation to the transportation sector in the Urals area and in the

* Table 5 follows on p. 15.
** Following p. 4, above.
*** Table 6 follows on p. 16.

Table 5

Estimated Distribution of the Total Final Consumption of Electric Power in the USSR, by Area a/
Selected Years, 1950-58, and 1965 Plan

Area	1950		1955		1958		1965 Plan	
	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent
European areas								
RSFSR	29.4	36.9	51.9	34.8	67.7	32.8	130.9	28.8
Non-RSFSR	19.6	24.6	39.2	26.3	53.4	25.9	108.5	23.9
Urals area	16.3	20.4	29.0	19.5	40.6	19.7	74.6	16.4
Eastern areas								
RSFSR	9.0	11.3	19.1	12.8	30.2	14.7	100.2	22.0
Non-RSFSR	5.4	6.8	9.9	6.6	14.2	6.9	40.6	8.9
Total final consumption	79.7	100.0	149.1	100.0	206.1	100.0	454.8	100.0

a. See the second footnote on p. 3, above.

Table 6

Estimated Structure of Allocation of the Final Consumption of Electric Power in the USSR, by Area and by Economic Sector a/ 1958

Percent

	European Areas				
Economic Sector	RSFSR	Non-RSFSR	Urals Area	Eastern Areas	Total
Industry	67	77	85	74	75
Construction	5	4	2	5	4
Transportation	3	2	5	8	4
Urban economy	21	13	7	9	14
Rural economy	4	4	1	4	3
Total	100	100	100	100	100

a. See the second footnote on p. 3, above.

eastern areas. The higher proportional allocation of electric power to the urban economy in the European RSFSR can be attributed mainly to consumption by Leningrad and Moscow, with their highly developed urban utilities and many governmental establishments.

The estimated distribution of consumption of electric power by industry in the USSR by area is shown in Table 7* and on the map, Figure 1.** The paramount position of the European RSFSR, which accounted for one-third of all consumption of electric power by industry in 1950, was still maintained in 1958. By 1965, however, the share of this area is planned to decline to about one-fourth of consumption of electric power by industry. The non-RSFSR area of the European USSR has consistently used about 4 billion kwh less than the RSFSR for industry and apparently will continue to do so in 1965. The share of the Urals area in consumption of electric power by industry in the USSR, which was between one-fourth and one-fifth of the total consumption during 1950-58, is planned to decline to less than one-fifth in 1965. The eastern RSFSR used 12 to 15 percent of the total amount of power consumed by Soviet industry during 1950-58 and, according to the Seven Year Plan, apparently will use almost one-fourth of the power allocated to industry in 1965.

* Table 7 follows on p. 17.
** Following p. 4, above.

Table 7

Estimated Distribution of Consumption of Electric Power
by Industry in the USSR, by Area a/
Selected Years, 1950-58, and 1965 Plan

Billion Kilowatt-Hours

Area	1950	1955	1958	1965 Plan
European areas				
RSFSR	19.8	35.7	45.2	83.3
Non-RSFSR	15.1	30.9	41.1	77.0
Urals area	14.2	24.8	34.5	61.0
Eastern areas				
RSFSR	7.1	14.4	22.5	80.4
Non-RSFSR	4.4	7.5	10.9	30.7
Total industry	60.6	113.3	154.2	332.4

a. See the second footnote on p. 3, above.

II. Branch Allocation of Consumption by Industry

A. Trends

Consumption of electric power by each branch of industry in the USSR has steadily increased each year since 1945. The share allocated to the fuel, ferrous metallurgical, and machine building and metalworking branches of industry decreased from 59 percent in 1945 to 46 percent in 1960 as a new industry, the nuclear materials industry, was introduced into the consumption pattern and consumed increasingly larger amounts of electric power, until by 1960 it was using almost 14 percent of all electric power allocated to industry. It is apparently planned* that the proportional allocation to the fuel, ferrous metallurgical, and machine building and metalworking branches of industry will decline to 41 percent by 1965 and that the share of the nuclear materials industry will grow to more than 18 percent. In a sense, then, consumption of electric power by the nuclear materials industry has grown at the expense of the

* Planned consumption of electric power by various branches of industry in 1965 is derived from planned output by the respective branches of industry and from planned or projected trends in unit consumption of electric power.

fuel, ferrous metallurgical, and machine building and metalworking branches of industry, and other consumers as a whole have retained roughly the same shares throughout the 20-year period. The estimated consumption of electric power by Soviet industry is summarized by branch of industry in Table 8* and shown graphically in Figure 5.**

The planned levels of consumption indicated for 1965 probably will be achieved in most branches of industry. Present estimates indicate, however, that consumption of electric power probably will be short of the plan by about 4 billion kwh in the chemical industry and by 2 billion kwh in each of the following: the nonferrous metals industry; the timber, woodworking, and paper industry; and light industry. It is estimated that consumption of electric power will exceed the plan by about 3 billion kwh in the construction materials industry and by 5 billion kwh in the machine building and metalworking industry and will approximately fulfill the plan in the other nonnuclear branches of industry. If Soviet industry as a whole fails to fulfill the plan for consumption of electric power by 5 billion kwh (as a projection of recent trends would indicate) and if nonnuclear industry fails to achieve planned levels of consumption by 2 billion kwh, the nuclear materials industry will fall short of its planned consumption in 1965 by 3 billion kwh. As the degree of underfulfillment of plans for consumption of electric power by industry as a whole and by the nuclear materials industry in particular is small enough to fall within the range of error attached to the estimates of consumption by these consumers, it is estimated that the plans for consumption of electric power will be approximately fulfilled.

A comparison of the pattern of consumption of electric power by various branches of industry in the USSR in 1958 with that in the US shows that the relative allocation of electric power to the fuel industry in the USSR was much greater and that the relative share going to the metallurgical and the machine building and metalworking industries was considerably greater than in the US. The relative allocation to the timber, woodworking, and paper industry and to the chemical and nuclear materials industries in the US was, however, much greater than in the USSR, as is shown in Table 9.***

B. Major Nonnuclear Branches of Industry

Consumption of electric power by the fuel industry is estimated to have reached 28.2 billion kwh in 1960 and 30.2 billion kwh in 1961, seven times the 1945 level and more than consumption by any other

* Table 8 follows on p. 19.
** Following p. 20.
*** Table 9 follows on p. 21.

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Table 8

Estimated Allocation of Consumption of Electric Power in the USSR, by Branch of Industry a/
Selected Years, 1945-62, and 1965 Plan

Branch of Industry	1945		1950		1955		1958		1960		1961		1962		1965 Plan	
	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent
Fuel	4.2	14.6	9.1	15.0	17.4	15.3	24.7	16.0	28.2	14.8	30.2	14.2	32.6	13.7	42.5	12.8
Ferrous metals	5.6	19.7	11.0	18.2	19.0	16.8	24.7	16.1	31.5	16.5	35.0	16.5	39.5	16.6	54.9	16.5
Nonferrous metals	3.8	13.2	6.9	11.4	15.1	13.3	18.1	11.7	23.3	12.2	27.4	12.9	31.3	13.2	46.5	14.0
Chemical	3.2	11.1	6.1	10.0	10.8	9.5	14.8	9.6	18.0	9.4	20.3	9.5	22.6	9.5	34.7	10.4
Machine building and metal-working	7.0	24.7	10.9	18.0	17.9	15.8	23.2	15.1	27.8	14.6	30.3	14.2	33.3	14.0	38.0	11.4
Timber, woodworking, and paper	1.0	3.6	3.7	6.1	5.7	5.0	6.7	4.4	7.4	3.9	7.7	3.6	8.2	3.4	10.9	3.3
Construction materials	0.6	2.1	2.5	4.1	5.1	4.5	7.8	5.0	10.5	5.5	12.0	5.6	13.3	5.6	17.9	5.4
Light industry	1.4	5.0	3.6	5.9	6.0	5.3	7.3	4.7	8.1	4.3	8.5	4.0	9.5	4.0	12.9	3.9
Food industry	1.2	4.2	2.6	4.2	4.0	3.5	5.0	3.2	5.7	3.0	6.1	2.9	6.4	2.7	7.6	2.3
Nuclear materials	Negl.	Negl.	3.0	5.0	10.0	9.0	18.9	12.3	26.4	13.9	31.6	14.8	37.0	15.5	60.8	18.3
Other industry	0.4	1.8	1.3	2.1	2.3	2.0	3.0	1.9	3.6	1.9	3.9	1.8	4.3	1.8	5.7	1.7
Total	28.4	100.0	60.6	100.0	113.3	100.0	154.2	100.0	190.5	100.0	213.0	100.0	238.0	100.0	332.4	100.0

a. Because of rounding, data may not add to the totals shown, and percentages may not be directly derived from the absolute data shown.

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Figure 5

Estimated Consumption of Electric Power in the USSR by Branch of Industry, 1945-1965

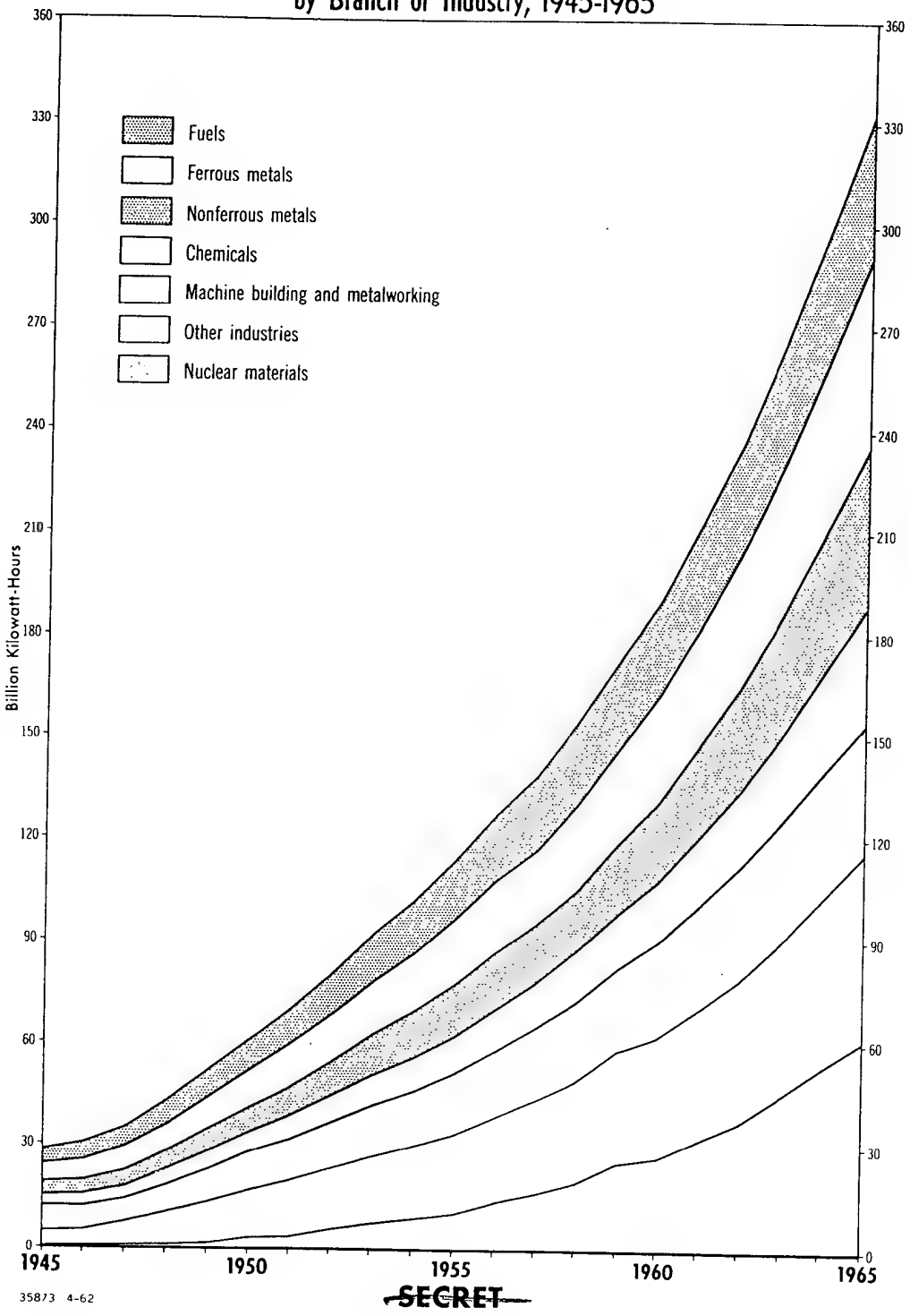

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Table 9

Estimated Consumption of Electric Power in the USSR and the US
by Branch of Industry
1958

Branch of Industry	Billion Kilowatt-Hours		Percent of Industry		USSR as a Percent of US
	USSR	US	USSR	US	
Fuel	24.7	21.2	16.0	6.3	117
Metallurgical	42.8	82.3	27.8	24.5	52
Chemical	14.8	51.8	9.6	15.4	29
Machine building and metalworking	23.2	39.5	15.1	11.7	59
Timber, woodworking, and paper	6.7	34.1	4.4	10.1	20
Construction materials	7.8	13.0	5.0	3.9	60
Light industry	7.3	15.2	4.7	4.5	48
Food industry	5.0	15.2	3.2	4.5	33
Nuclear materials	18.9	58.0	12.3	17.3	33
Other industry	3.0	5.9	1.9	1.8	51
Total	154.2	336.2	100.0	100.0	45

group of industries. The rapid growth during 1945-60 was a result not only of the 274-percent increase in production of commercial fuel* but also of an 82-percent increase in the specific consumption of electric power per ton of standard fuel produced. Within the fuel industry the coal industry has been by far the largest consumer, although the proportional allocation to the petroleum and natural gas industry has been gradually increasing, as shown in Table 10.**

The amount of electric power needed to produce 1 metric ton*** of standard fuel in the coal industry increased during 1945-60 by 94 percent as a result of greater mechanization and the higher proportion of cleaning activity, but the corresponding figure in the oil

* Measured in standard fuel units, defined as having 7,000 kilocalories per kilogram.

** Table 10 follows on p. 22.

*** Tonnages are given in metric tons throughout this report.

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Table 10

Estimated Allocation of Consumption of Electric Power by the Fuel Industry in the USSR a/
Selected Years, 1945-60, and 1965 Plan

Branch of the Fuel Industry	1945		1950		1955		1960		1965 Plan	
	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent
Coal	2.5	59	5.2	57	10.1	58	15.3	54	19.1	45
Petroleum and natural gas	1.4	33	3.3	36	6.2	36	11.8	42	22.1	52
Peat	0.3	8	0.6	6	0.8	4	0.7	3	0.8	2
Oil shale and manufactured gas	Negl.	Negl.	0.1	1	0.3	2	0.4	1	0.5	1
Total	4.2	100	9.1	100	17.4	100	28.2	100	42.5	100

a. Because of rounding, data may not add to the totals shown, and percentages may not be directly derived from the absolute data shown.

and natural gas industry was at the same level in 1960 as in 1945. The latter industry increased its levels of electrification considerably but was able to offset these increases by stressing the development of less power-intensive methods of petroleum extraction. It is estimated that consumption of electric power by the fuel industry in 1962 will be 32.6 billion kwh and that the planned consumption for 1965 is 42.5 billion kwh. It is estimated that the actual consumption will be close to this level, as consumption goals of the coal industry probably will be underfulfilled by about the same amount that consumption goals of the petroleum industry will be overfulfilled, largely as a result of decreased production in the coal industry and increased production in the petroleum industry.

The ferrous metallurgical industry was the largest consumer of electric power in Soviet industry throughout most of the postwar period, as consumption grew from 5.6 billion kwh in 1945 to 31.5 billion kwh in 1960 and 35.0 billion kwh in 1961. During 1945-51, consumption of electric power per ton of finished product decreased by 30 percent as a result of increasing efficiency in operation, but since 1951 the expenditures for electric power, per ton of product, have grown by 21 percent as a result of the processing of progressively leaner ores, the use of more power-intensive production techniques, and the increasing complexity of the product mix. Within the industry the relative shares of electric power allocated to mining operations have remained about the same in spite of more complex processing. The shares allocated to coke and finishing operations have increased as a result of the increasing complexity of product mix, whereas the shares allocated to basic processing and to miscellaneous auxiliary operations have decreased as a result of increasing efficiencies in operation. It is estimated that consumption of electric power by the ferrous metallurgical industry in 1962 will be close to 40 billion kwh and that the planned consumption in 1965 is 54.9 billion kwh. It is estimated that the plan for production of steel in the USSR in 1965 will be exceeded but that the plan for consumption of electric power by the ferrous metallurgical industry will not be overfulfilled. A continuation of trends over the past 5 years would indicate that the overfulfillment of production of steel will be more than offset by an underfulfillment in the rather ambitious plan for increasing consumption of electric power per ton of product.

The nonferrous metallurgical industry is estimated to have used 27.4 billion kwh in 1961 compared with 15.1 billion kwh in 1955 and 3.8 billion kwh in 1945. Throughout 1945-61, there has been a continuing annual reduction of 1 to 2 percent in consumption of electric power per ton of product as a result of increasing efficiencies in consumption of electric power. It is estimated that consumption by the nonferrous metallurgical industry will reach 31.3 billion kwh in 1962; that the plan for 1965 is 46.5 billion kwh, of which 32.6 billion kwh

are to be used for light metals; and that the actual consumption of electric power by the branch in 1965 will be about 2 billion kwh less than planned because of the probable underfulfillment in the plan for production of the copper industry. The relative shares of the various nonferrous metals industries in consumption of electric power by branches are estimated to have changed as shown in Table 11.*

The chemical industry has consistently used about 10 percent of the total industrial consumption of electric power in the postwar period. Consumption is estimated to have been 20.3 billion kwh in 1961, is expected to be about 22.6 billion kwh in 1962, and is planned to grow to about 34.7 billion kwh in 1965. Consumption of electric power per ruble of output by the chemical industry has gradually declined as a result of the declining relative importance within this branch of industry of power-intensive electrochemical production and of increasing efficiency in the use of electric power. The estimated allocation of electric power among the major components of the chemical industry is shown in Table 12.**

Within the nitrogen group, there has been an increasing allocation of electric power to production of heavy water by electrolysis. It is estimated that consumption of electric power by the chemical industry may be about 4 billion kwh less than planned in 1965 as a result of the probable underfulfillment of production goals.***

The Soviet machine building and metalworking industry is estimated to have increased its consumption of electric power from 7.0 billion kwh in 1945 to 10.9 billion kwh in 1950, 17.9 billion kwh in 1955, 27.8 billion kwh in 1960, and 30.3 billion kwh in 1961. About three-fourths of this power goes to machine building and the remainder to metalworking and repair. Consumption of electric power per ton of ferrous metals used by this branch of industry is estimated to have increased only slightly in the postwar period. An approximate increase of 50 percent in consumption of electric power for technological uses (such as electric furnaces, heat treatment, and welding) per ton of ferrous metals used has been offset by an equivalent reduction in the amount of power used for such purposes as lighting and ventilation. During 1950-58 the amounts of power used for the manufacturing of producers durables increased from 55 percent to 67 percent of the total power consumption by the machine building industry. The amounts of power estimated to have been allocated to consumers durables increased

* Table 11 follows on p. 25.

** Table 12 follows on p. 26.

*** Based on estimated production of the chemical industry in 1965 and a projection of the relationship between consumption of electric power and output of the chemical industry during 1950-60.

Table 11

Estimated Allocation of Consumption of Electric Power by the Nonferrous Metallurgical Industry in the USSR a/
Selected Years, 1950-60, and 1965 Plan

Branch of the Nonferrous Metallurgical Industry	1950		1955		1960		1965 Plan	
	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent
Light metals	3.9	57	9.8	65	14.7	63	32.6	70
Copper	1.0	14	1.7	11	3.0	13	5.1	11
Lead-zinc	0.7	10	1.5	9	2.3	10	3.0	6
Nickel-cobalt	0.6	9	1.0	7	1.9	8	4.0	9
Other	0.7	10	1.1	8	1.4	6	1.8	4
Total	6.9	100	15.1	100	23.3	100	46.5	100

a. Because of rounding, data may not add to the totals shown, and percentages may not be derived from the absolute figures shown.

Table 12

Estimated Allocation of Consumption of Electric Power by the Chemical Industry in the USSR a/
Selected Years, 1950-60, and 1965 Plan

Branch of the Chemical Industry	1950		1955		1960		1965 Plan	
	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent	Billion Kilowatt-Hours	Percent
Mineral chemicals and mineral fertilizers	0.3	5	0.6	5	0.9	5	1.4	4
Soda group	0.7	12	1.3	12	2.4	11	4.5	13
Nitrogen group	2.4	39	4.1	38	6.1	37	9.0	26
Other inorganic chemicals	1.4	23	2.4	22	3.8	22	5.8	17
Rubber group	0.7	11	1.0	9	1.6	9	4.6	13
Other organic chemicals (including synthetics)	0.4	7	1.0	10	2.4	12	8.2	24
Other chemical products	0.2	3	0.4	4	0.8	4	1.2	3
Total	6.1	100	10.8	100	18.0	100	34.7	100

a. Because of rounding, data may not add to the totals shown, and percentages may not be directly derived from the absolute data shown.

from 2 percent to 5 percent in the same period, whereas consumption of electric power by military end items is estimated to have fallen from 43 percent of the total consumption by machine building in 1950 to 27 percent in 1958. A probable overfulfillment in the production plan for 1965 for machine building and metalworking together with a continuation of the past trend in the relationship between consumption of electric power and the value of output indicates that consumption of electric power by this branch of industry in 1965 may be about 5 billion kwh more than the 38 billion kwh planned.

Other industries have not individually been major consumers of electric power, although they have, in total, used large amounts of electric power.

C. Distribution by Area

The branch structure of consumption of electric power by industry in the various areas of the USSR showed two trends during 1950-58 that are worthy of note. Most noticeable was the introduction into the consumption pattern in the Urals and eastern areas of a substantial allocation of electric power to the nuclear materials industry accompanied by a decline in the share of other industries in power consumption by area. Consumption of electric power by the nuclear materials industry grew during 1950-58 to 25 percent of the total power consumption by industry in the Urals area, 35 percent in the eastern RSFSR, and 11 percent in Central Asia and Kazakhstan. Except for this development, however, there has been a general tendency throughout most areas for the proportional allocation of power to any one branch of industry to decrease and for the consumption pattern of the area to become more diversified, as areas have become more balanced in their industrial development. The estimated allocation of consumption of electric power by branch of industry and by area in the USSR in 1958 is shown in Table 13.*

According to plans, the nuclear materials industry is to account for an even greater percentage of consumption of electric power in the eastern RSFSR in 1965, when it is to use 50 percent of the power allocated to industry in the area. In 1965 the nuclear materials industry is still to use 25 percent of the power consumed by industry in the Urals and 13 percent in the Central Asian republics and Kazakhstan. The estimated planned structure of the branch allocation of consumption of electric power by industry and by area in the USSR in 1965 is shown in Table 14.**

* Table 13 follows on p. 28.

** Table 14 follows on p. 29 (text continued on p. 30).

Table 13

Estimated Consumption of Electric Power in the USSR
by Branch of Industry and by Area a/
1958

Billion Kilowatt-Hours

Branch of Industry	European Areas			Eastern Areas		
	RSFSR	Non-RSFSR	Urals Area	RSFSR	Non-RSFSR	Total
Fuel	6.7	9.4	3.8	3.2	1.6	24.7
Ferrous metals	2.8	11.4	7.8	1.7	1.0	24.7
Nonferrous metals	3.2	3.1	5.8	3.5	2.5	18.1
Chemical	5.4	4.4	1.8	1.1	2.1	14.8
Machine building and metalworking	11.3	5.4	3.4	2.5	0.6	23.2
Timber, woodworking, and paper	3.4	1.0	1.2	1.0	0.1	6.7
Construction materials	3.5	2.2	1.0	0.4	0.7	7.8
Light industry	5.4	1.1	0.1	0.4	0.3	7.3
Food industry	1.7	2.0	0.3	0.5	0.5	5.0
Nuclear materials	0.7	0.5	8.6	7.9	1.2	18.9
Other industry	1.1	0.6	0.7	0.3	0.3	3.0
Total industry	45.2	41.1	34.5	22.5	10.9	154.2

a. See the second footnote on p. 3, above.

Table 14

Estimated Consumption of Electric Power in the USSR
by Branch of Industry and by Area a/
1965 Plan

Billion Kilowatt-Hours

Branch of Industry	European Areas			Eastern Areas		Total
	RSFSR	Non-RSFSR	Urals Area	RSFSR	Non-RSFSR	
Fuel	12.3	14.9	5.6	5.8	3.9	42.5
Ferrous metals	6.4	24.2	15.6	4.6	4.1	54.9
Nonferrous metals	8.3	5.4	9.4	15.5	7.9	46.5
Chemical	12.3	9.4	4.5	4.4	4.1	34.7
Machine building and metalworking	17.5	9.4	5.5	4.3	1.3	38.0
Timber, woodworking, and paper	4.8	1.7	1.4	2.7	0.3	10.9
Construction materials	7.6	4.3	2.2	1.4	2.4	17.9
Light industry	8.7	2.7	0.1	0.5	0.9	12.9
Food industry	2.4	3.2	0.4	0.8	0.8	7.6
Nuclear materials	0.8	0.8	15.1	40.0	4.1	60.8
Other industries	2.2	1.1	1.2	0.4	0.8	5.7
Total industry	83.3	77.0	61.0	80.4	30.7	332.4

a. See the second footnote on p. 3, above. Because of rounding, data may not add to the totals shown, and percentages may not be directly derived from the absolute data shown.

III. Consumption by the Nuclear Materials Industry

A. Trends

Starting from insignificant levels in the immediate postwar period, consumption of electric power by the nuclear materials industry in the USSR is estimated to have grown to 26.4 billion kwh in 1960 and 31.6 billion kwh in 1961. Apparently it is planned that the industry continue its rapid growth and that it will use close to 37 billion kwh in 1962 and 61 billion kwh in 1965.* The estimated consumption of electric power by the nuclear materials industry in the USSR and in the US is given in Table 15** and is shown graphically in Figure 3.*** It is estimated that in 1961 the nuclear materials industry in the USSR used 56 percent as much electric power as did the USAEC; that the Soviet industry will use 68 percent as much in 1962; and that, if planned future changes are carried out, it will be consuming in 1965 significantly greater amounts of electric power than the US nuclear materials industry. If, as is quite possible, Soviet consumption does not exceed 58 billion kwh in 1965, it will still exceed that of the US. Not until 1965 will the nuclear materials industry in the USSR use 18 percent of the electric power allocated to industry, a share attained by the US in 1956, when the consumption by the US industry reached its peak.

The major share of the power used by the Soviet nuclear materials industry has gone to the gaseous diffusion program for production of uranium enriched in U-235. It is estimated that gaseous diffusion plants in the USSR used close to 18 billion kwh in 1960 and 21 billion kwh in 1961. It also is estimated that gaseous diffusion plants are planned to use about 25 billion kwh in 1962 and almost twice this amount in 1965. Compared with the US program, the Soviet nuclear materials industry apparently uses a much larger proportion of consumption of electric power for technological uses, such as electrolysis and electric furnaces.

B. Distribution by Area

The Urals and the eastern RSFSR together have used about 80 to 90 percent of the electric power estimated to have been consumed by the nuclear materials industry in the USSR. The amounts of electric power

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* The figures given for the planned consumption of electric power by the Soviet nuclear materials industry in 1962 and 1965 are derived from national and area power balances based on fragmentary Soviet data and thus are estimated plans rather than directly reported plans.

** Table 15 follows on p. 31.

*** Following p. 10, above.

Table 15

Estimated Consumption of Electric Power
by the Nuclear Materials Industry in the USSR and the US
Selected Years, 1945-61, and 1962 and 1965 Plans

Year	Consumption (Billion Kilowatt-Hours)		USSR as a Percent of the US	Percent of Industrial Consumption	
	USSR	USAEC		USSR	US
1945	Negl.	3.0	Negl.	Negl.	2.2
1950	3.0	3.8	79	5.0	2.1
1955	10.0	50.1	20	9.0	15.6
1956	13.2	60.7	22	10.4	17.7
1958	18.9	58.0	33	12.3	17.3
1960	26.4	57.9	46	13.8	13.5
1961	31.6	56.2	56	14.8	13.1
1962 Plan a/	37.0	54.1	68	15.5	11.4
1965 Plan a/	60.8	50.6	120	18.3	8.7

a. See the first footnote on p. 30, above.

estimated to have been consumed by the nuclear materials industry in the USSR, distributed by area, are given for selected years in Table 16 and are shown on the map, Figure 1.*

Table 16

Estimated Distribution of Consumption of Electric Power by the Nuclear Materials Industry in the USSR, by Area a/ Selected Years, 1950-60, and 1965 Plan

Billion Kilowatt-Hours

Area	1950	1955	1958	1960	1965 Plan
European areas					
RSFSR	0.3	0.8	0.7	0.7	0.8
Non-RSFSR	0.1	0.8	0.5	0.8	0.8
Urals area	1.6	4.6	8.6	9.9	15.1
Eastern areas					
RSFSR	0.7	3.1	7.9	13.5	40.0
Non-RSFSR	0.3	0.7	1.2	1.5	4.1
Total	3.0	10.0	18.9	26.4	60.8

a. See the second footnote on p. 3, above.

The nuclear materials industry in the Urals area has consistently used about half of the electric power allocated to the industry, having increased its consumption from 1.6 billion kwh in 1950 to 4.6 billion kwh in 1955 and 9.9 billion kwh in 1960. Soviet plans apparently call for consumption to increase to an estimated level of 15.1 billion kwh in 1965.

Until recently, the second largest consumption by area has been in the eastern RSFSR, where consumption is estimated to have grown from 0.7 billion kwh in 1950 to 3.1 billion kwh in 1955 and 7.9 billion kwh in 1958. It is estimated, however, that nuclear materials enterprises in the eastern RSFSR in 1960 consumed 13.5 billion kwh -- more than similar enterprises in the Urals.

An analysis of Soviet plans indicates that consumption of electric power during 1960-65 by the nuclear materials industry in the eastern

* Following p. 4, above.

RSFSR will grow by 27 billion kwh, an amount in excess of the total consumption by the nuclear materials industry in the USSR in 1960 and equal to 80 percent of the total growth in consumption by the industry in the period. Plans apparently call for consumption of 40 billion kwh, two-thirds of the total consumption by the Soviet nuclear materials industry, in the eastern RSFSR in 1965. This amount will be substantially the same as that to be consumed by the three gaseous diffusion plants in the Oak Ridge - Paducah - Portsmouth complex in the US. If the USSR fails to fulfill its apparent plan for consumption of electric power by the nuclear materials industry in 1965, the underfulfillment probably will occur in the eastern RSFSR.